Red Rocks Lake NWR - Narrative Report-
1970

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF May TO August, 1970

(1) Species	(2) Weeks of reporting period: 4/26-5/2 (1)	5/03-9 (2)	5/10-16 (3)	5/17-23 (4)	5/24-30 (5)	5/31-6/6 (6)	6/7-13 (7)	6/14-20 (8)	6/21-27 (9)	6/28-7/4 (10)
Swans:										
Whistling										
Trumpeter	150	150	150	150	150	150	150	150	200	250
Geese: Total Swan:	150	150	150	150	150	150	150	150	200	250
Canada	250	250	250	250	250	250	300	300	300	300
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other Total Geese:	250	250	250	250	250	250	300	300	300	300
Ducks:										
Mallard	1,500	1,500	1,500	1,500	1,500	1,500	1,500	2,000	2,200	2,500
Black										
Gadwall	350	350	350	350	350	350	350	400	400	450
Baldpate	450	450	450	450	450	450	450	500	500	550
Pintail	600	350	350	350	350	350	350	400	400	450
Green-winged teal	250	250	250	250	250	250	250	250	250	300
Blue-winged teal		75	75	75	75	75	75	75	75	100
Cinnamon teal	100	250	350	350	350	350	350	350	350	400
Shoveler	75	200	250	250	250	250	250	250	250	300
Wood										
Redhead	350	500	600	600	600	600	600	600	600	1,000
Ring-necked	250	300	300	300	300	300	300	300	300	400
Canvasback	500	450	400	400	400	400	400	400	400	800
Scaup	200	500	1,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Goldeneye	1,000	500	100	100	100	100	100	100	100	100
Bufflehead	300	250	250	250	250	250	250	250	250	300
Ruddy		300	500	750	750	750	750	750	750	1,000
Other Total Ducks:	5,925	6,225	6,725	7,475	7,475	7,475	7,475	8,125	8,325	10,150
Coot:	2,000	2,500	3,000	3,000	3,000	3,000	3,000	3,200	3,200	4,000

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF May TO August, 1970

(1) Species	(2) Weeks of reporting period: 7/05-11 (11)	7/12-18 (12)	7/19-25 (13)	7/26-8/1 (14)	8/2-8 (15)	8/9-15 (16)	8/16-22 (17)	8/23-29 (18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter	250	250	250	250	250	250	250	250	25,500	25	50
Geese: Total Swan:	250	250	250	250	250	250	250	250	25,500	25	50
Canada	200	200	150	100	100	100	140	140	26,810	7	40
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other Total Geese:	200	200	150	100	100	100	140	140	26,810	7	40
Ducks:											
Mallard	3,500	3,500	3,500	3,500	3,500	3,500	2,000	1,500	291,900	62	1,815
Black											
Gadwall	800	800	800	800	800	800	500	450	66,150	10	339
Baldpate	600	1,200	1,200	1,200	1,200	1,200	10,000	20,000	289,100	22	691
Pintail	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	83,650	19	535
Green-winged teal	550	550	550	550	550	550	500	300	46,550	10	306
Blue-winged teal	175	175	175	175	175	175			12,250	3	59
Cinnamon teal	900	900	900	900	900	900	550	550	67,900	18	508
Shoveler	550	550	550	550	550	550	300	200	42,875	10	300
Wood											
Redhead	2,000	2,000	2,000	2,000	2,000	2,000	1,500	1,500	147,350	55	1,196
Ring-necked	800	1,000	1,000	1,000	1,000	1,000	500	500	68,950	28	749
Canvasback	1,000	1,500	1,500	1,500	1,500	1,500	1,000	1,000	105,350	33	1,009
Scaup	2,000	4,000	4,000	4,000	4,000	4,000	2,500	2,500	274,400	85	2,497
Goldeneye	175	175	175	175	175	175	100	100	24,850	4	65
Bufflehead	300	400	400	400	400	400	150	150	36,400	8	281
Ruddy	1,000	1,000	1,500	1,500	1,500	1,500	1,000	500	110,600	58	1,284
Other Total Ducks:	15,350	18,750	19,250	19,250	19,250	19,250	21,600	30,250	1,668,275	432	11,634
Coot:	5,000	5,500	7,000	7,000	7,000	7,000	12,000	15,000	667,800	223	3,978

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	25,500	250	50	Principal feeding areas Upper, Lower Lake and Rivermarsh.
Geese	26,810	300	40	
Ducks	1,668,275	30,250	11,634	Principal nesting areas Over water in carex stands adjacent
Coots	667,800	15,000	3,978	uplands close to marsh edge.

Reported by R.V. Papike, Assistant Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF September TO December, 1970

(1) Species	(2) Weeks of reporting period: 8/30-9/5 (1)	9/6-12 (2)	9/13-19 (3)	9/20-26 (4)	9/27-10/3 (5)	10/4-10 (6)	10/11-17 (7)	10/18-24 (8)	10/25-31 (9)	11/1-7 (10)
Swans:										
Whistling							500	1,500	500	
Trumpeter	150	150	150	200	100	100	100	150	150	100
Total Swan:	150	150	150	200	100	100	600	1,650	650	100
Geese:										
Canada	140	150	200	200	350	350	500	500	500	300
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Total Geese:	140	150	200	200	350	350	500	500	500	300
Ducks:										
Mallard	1,500	1,500	1,200	1,200	600	600	600	600	500	500
Black										
Gadwall	450	450	450	400	1,600	1,600	1,600	1,600	300	
Baldpate	20,000	20,000	20,000	18,000	18,500	18,500	18,500	18,500	5,000	1,000
Pintail	1,000	1,000	1,000	1,000	500	500	500	500	250	100
Green-winged teal	300	300	300	850	400	350	350	350	350	50
Blue-winged teal										
Cinnamon teal	550	550	550	500	250	250	250	250	100	
Shoveler	200	200	200	350	200	200	200	200	100	50
Wood										
Redhead	1,500	1,500	1,500	1,000	500	500	500	500	300	100
Ring-necked	500	500	500	200	100					
Canvasback	1,000	1,000	1,000	500	200	200	200	200	100	
Scaup	2,500	2,500	2,500	1,000	600	600	600	600	200	
Goldeneye	100	100	100	200	250	250	250	250	500	500
Bufflehead	150	150	150	200	100	100	100	100	100	100
Ruddy	500	500	500	400	100	50	50	50		
Other										
Total Ducks:	30,250	30,250	29,950	25,800	23,900	23,700	23,700	23,700	7,800	2,400
Coot:	15,000	15,000	20,000	25,000	28,500	28,500	28,500	25,000	5,000	250

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF September TO December, 1970

(1) Species	(2) Weeks of reporting period: 11/8-14 (11)	11/15-21 (12)	11/22-28 (13)	11/29-12/5 (14)	12/6-12 (15)	12/13-19 (16)	12/20-26 (17)	12/27-18 (18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling									17,500		
Trumpeter	100	90	90	90	120	120	150		14,770		
Geese: Total Swan:	100	90	90	90	120	120	150		32,270		
Canada	250	250	50	50					26,530		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other Total Geese:	250	250	50	50					26,530		
Ducks:											
Mallard	500	500	300	300	300	300	300		79,100		
Black											
Gadwall									59,150		
Baldpate	500	500	300	300	200	200	200		1,121,400		
Pintail	100								45,150		
Green-winged teal									25,200		
Blue-winged teal											
Cinnamon teal									22,750		
Shoveler									13,300		
Wood											
Redhead	50	50	25	25	25	25	25		56,875		
Ring-necked									12,600		
Canvasback									30,800		
Scaup									77,700		
Goldeneye	500	500	500	300	300	200	200		35,000		
Bufflehead	100	50	50	50	50	25	10		11,095		
Ruddy									15,050		
Other Total Ducks:	1,750	1,600	1,175	975	875	750	735		1,605,170		
Coot:	150	50							1,336,650		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	32,270	1,650	
Geese	26,530	500	
Ducks	1,605,170	30,250	
Coots	1,336,650	28,500	

SUMMARY

Principal feeding areas Culver Pond, Widgeon Pond, MacDonald Pond, Upper Lake, Lower Lake and the River Marsh.

Principal nesting areas

Reported by Ronald V. Papike, Assistant Refuge Manager.

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Red Rock Lakes Months of May to August 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Eared Grebe	6	05/15	600	08/15	End of	Period				600
Western Grebe	2	05/30	80	08/20	"	"				80
Pied-Billed Grebe	1	06/03	20	08/20	"	"				20
White Pelican	100	05/10	450	06/20	20	07/10				600
Double Crested Cormorant	2	08/10	2	08/10	End of	Period				5
Great Blue Heron	10	05/10	75	08/15	"	"	1	11	28	75
Black-Crowned Night Heron	2	05/20	35	08/15	"	"	1	5	10	35
American Bittern	1	06/10	125	08/30	"	"				125
Sandhill Crane	35	05/06	200	08/30	"	"				250
Sora Rail	8	06/18	3,500	08/15	"	"				3,500
II. Shorebirds, Gulls and Terns:										
Killdeer	6	05/05	250	08/15	End of	Period				500
Common Snipe	2	05/01	600	08/15	"	"				600
Long-Billed Curlew	2	05/10	75	08/25	"	"				75
Spotted Sandpiper	6	05/25	150	08/15	"	"				150
Willet	2	05/10	200	08/15	"	"				200
Greater Yellowlegs	1	08/05	15	08/20	"	"				100
Long-Billed Dowitcher	50	08/20	100	08/25	"	"				350
Western Sandpiper	50	07/20	400	08/30	"	"				800
Avocet	10	05/10	200	08/15	"	"				200
Wilson's Phalarope	25	05/10	2,500	08/10	"	"				2,500
California Gull	50	05/10	200	08/15	"	"				350
Franklin's Gull	10	05/20	350	08/20	"	"				500
Forester's Tern	8	05/25	150	08/20	"	"				150
Common Tern	2	05/25	150	08/20	"	"				150
Black Tern	2	06/05	500	08/20	"	"				500

(over)

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove	1	05/01	5	08/25	End of Period			
White-winged dove								
Bald Eagle	1	07/15	1	07/15	1	07/15		2
IV. Predaceous Birds:								
Golden eagle	1	06/10	2	08/10	2	08/10		5
Duck hawk	2	07/15	4	07/25	End of	Period		6
Horned owl	1	05/10	10	08/10	"	"		15
Magpie	10	05/01	200	08/20	"	"		200
Raven								
Crow	6	05/20	100	08/20	"	"		150
Goshawk	1	05/07	14	08/10	"	"		6
Sharp-Shinned Hawk	1	06/10	6	08/10	"	"		10
Red-Tailed Hawk	2	05/03	20	08/30	"	"		50
Swainson's Hawk	1	05/10	8	08/05	"	"		25
Prairie Falcon	1	07/02	2	07/02	2	07/02		4
Sparrow Hawk	2	05/25	35	08/30	End of	Period		100

Reported by Ronald V. Papike, Asst. Mgr.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Red Rock Lakes Months of September to December 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:			Peaked During							
Eared Grebe	Previous	Period	Last	Period	1	09/30				350
Western Grebe	"	"	"	"	2	09/10				100
Pied-Billed Grebe	"	"	"	"	1	09/30				100
Double Crested Cormorant	"	"	"	"	1	09/05				10
Great Blue Heron	"	"	"	"	2	09/20				35
Black-Crowned Night Heron	"	"	"	"	5	09/10				15
American Bittern	"	"	"	"	10	09/10				300
Sandhill Crane	"	"	"	"	3	10/06				250
Sora Rail	"	"	"	"	30	09/10				2,500
II. Shorebirds, Gulls and Terns:										
Killdeer	"	"	"	"	1	10/06				200
Common Snipe	"	"	"	"	10	10/20				1,000
Willet	"	"	"	"	2	10/25				100
Greater Yellowlegs	"	"	"	"	15	09/10				35
Long-Billed Dowitcher	"	"	"	"	50	09/10				200
Western Sandpiper	"	"	"	"	20	09/30				500
Avocet	"	"	"	"	5	09/10				75
Wilson's Phalarope	"	"	"	"	30	09/30				1,000
California Gull	"	"	"	"	2	10/12				150
Franklin's Gull	"	"	"	"	10	09/10				350
Forester's Tern	"	"	"	"	10	09/10				200
Black Tern	"	"	"	"	2	09/20				350

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	Previous	Period	30	09/05	2	11/20				60
White-winged dove										
Bald Eagle	"	"	10	12/05	End of Period					20
IV. Predaceous Birds:										
Golden eagle	"	"	8	10/20	1	12/10				25
Duck hawk	"	"	4	09/01	1	09/07				6
Horned owl	"	"	15	11/01	End of Period					15
Magpie	"	"	200	09/01	End of Period		"			250
Raven	4	12/10	10	12/25	End of Period		"			10
Crow	Previous	Period	50	10/01	1	12/25	"			100
Goshawk	"	"	10	10/01	End of Period		"			10
Red-Tailed Hawk	"	"	20	09/10	1	09/25	"			30
Swainson's Hawk	"	"	10	09/10	1	09/20	"			15
Rough-Legged Hawk	1	09/25	20	10/20	1	11/10	"			40
Sparrow Hawk	Previous	Period	10	09/20	1	10/10	"			30

Reported by Ronald V. Papike, Asst. Mgr.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Red Rock Lakes For 12-month period ending August 31, 1970

Reported by R.V. Papike Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage	(3)	(3) Use-days	(4) Breeding Population	(5) Production
UNIT I	Crops		Ducks	813,100	826	1,305
Impoundments	Upland		Geese	8,740	10	15
&	Marsh		Swans	28,365	6	
Creeks	Water	350	Coots	126,800	88	72
	Total	350	Total	977,005	930	1,392
UNIT II	Crops		Ducks	1,219,700	980	3,519
Upper	Upland		Geese	44,260		
Lake	Marsh	20	Swans	34,570	6	2
	Water	2,880	Coots	489,000	104	252
	Total	2,900	Total	1,787,530	1,090	3,773
UNIT III	Crops		Ducks	203,300	570	1,049
Swan	Upland		Geese	600		
Lake	Marsh	100	Swans	5,300	18	10
	Water	300	Coots	108,675	234	432
	Total	400	Total	317,875	822	1,491
UNIT IV	Crops		Ducks	406,500	1,590	4,373
Rivermarsh	Upland		Geese	526	14	20
	Marsh	6,267.5	Swans	8,000	32	23
	Water	2,000	Coots	416,500	750	2,322
	Total	8,000	Total	831,526	2,386	6,738
UNIT V	Crops		Ducks	1,382,294	376	1,388
Lower	Upland		Geese	3,500	4	5
Lake	Marsh	340	Swans	11,519	14	15
	Water	1,200	Coots	652,275	356	900
	Total	1,540	Total	2,049,588	750	2,308
UNIT VI	Crops		Ducks	40,650		
Upland	Upland	26,566	Geese	600		
	Marsh	150	Swans	886		
	Water	50	Coots	18,000		
	Total	26,766	Total	60,136		
	Crops		Ducks	4,065,544	4,342	11,634
	Upland	26,566	Geese	58,226	28	40
	Marsh	6,610	Swans	88,640	76	50
	Water	6,780	Coots	1,811,250	1,532	3,978
	Total	40,223.5	Total	6,023,660	5,978	15,702

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge Red Rock Lakes

Year 1970

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/10-16	50	209	Widgeon 63, Scaup 52, Gadwall 21, Canvasback 16, Shoveler 13, Mallard 11, Ruddy 9, Pintail 8, Goldeneye 7, Cinnamon teal 7, Canada Goose 6, Redhead2, Bufflehead 2, Green-winged teal 2.	219	25	244	150	732
10/17-23	15	55	Widgeon 25, Scaup 14, Gadwall 6, Canvasback 5, Mallard 5, Cinnamon teal 3, Canada Goose 3, Redhead 2, Pintail 2, Bufflehead 1.	66	10	76	45	228
10/24-30	2	5	Widgeon 3, Scaup 1.	4	1	5	10	25
TOTAL	67	269	Widgeon 91, Lesser Scaup 67, Canvasback 21 Mallard 16, Shoveler 13, Pintail 10, Cinnamon Teal 10, Ruddy,9, Canada Goose 9, Goldeneye 7, Redhead 4, Bufflehead 3, Green-winged teal 2, Gadwall 27.	289	35	325	205	985

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

80348-60

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Red Rock Lakes Months of May to August, 19 70

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Blue Grouse	Conifers 3,000 acres								25	
Ruffed Grouse	Aspen-fir-willow 3,000 acres								50	
Sage Grouse	Sagebrush-grass 3,000 acres								70	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Red Rock Lakes Months of September to December, 19 70

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Blue Grouse	Conifers 3,000 acres								20	
Ruffed Grouse	Aspen-fir-willow 3,000 acres								75	
Sage Grouse	Sagebrush-grass 3,000 acres								35	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Red Rock Lakes Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
Black Bear												4	1	
Elk			1									85		
Mule Deer			4									100	15	
Moose			5									50	30	
Antelope			5									161		M-25 F-74 Y-62

Remarks:

Reported by R.V. Papike, Asst. Refuge Manager

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1755
Form NR-5
60701

DISEASE

Refuge Red Rock Lakes Year 1970

Botulism NONE NOTED

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease NONE NOTED

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Refuge Red Rock Lakes Year 19 70

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
						N E G A T I V E R E P O R T							

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

INTERIOR--PORTLAND, OREGON

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Red Rock Lakes County Beaverhead State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
N O N E								N O N E	
								Fallow Ag. Land N O N E	

No. of Permittees: Agricultural Operations N O N E Haying Operations 1 Grazing Operations 18

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle	5,937	11,527.62	23,053.24	25,520
				2. Other	5	15	35	115
				1. Total Refuge Acreage Under Cultivation				
Hay - Wild	286.78	460	2,007.46	2. Acreage Cultivated as Service Operation				

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.DUP.,D.C.61-88850

3-1570
NR-8a
(4/54)

REFUGE GRAIN REPORT

Refuge Red Rock Lakes Months of January through December, 1970

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Wheat	3,500	600	4,100			700		3,400		3,400	

(8) Indicate shipping or collection points Camas National Wildlife Refuge

(9) Grain is stored at Culver and MacDonald Ponds

(10) Remarks Supplemental winter swan feed.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb.; corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 17065

3-1761
Form NR-11

TIMBER REMOVAL

Refuge Red Rock Lakes Year 1970

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
			NEGATIVE REPORT					

Total acreage cut over..... Total income.....

No. of units removed B. F..... Method of slash disposal.....
Cords.....
Ties.....
.....

Interior--Duplicating Section, Washington, D. C. 24316

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge: Red Rock Lakes

Proposal Number:

Reporting Year: 1970

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NEGATIVE REPORT							

10. Summary of results (continue on reverse side, if necessary)

INTERIOR - PORTLAND, OREGON

N A R R A T I V E R E P O R T

F O R

RED ROCK LAKES NATIONAL WILDLIFE REFUGE

January 1, to December 31, 1970

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

LIMA, MONTANA

CONTENTS

N A R R A T I V E R E P O R T

RED ROCK LAKES NATIONAL WILDLIFE REFUGE

LIMA, MONTANA

January 1, 1970

through

December 31, 1970

P E R S O N N E L

Eugene D. Stroops . . . . . Refuge Manager

Ronald V. Papike . . . . . Assistant Refuge Manager

Dan J. Sullivan . . . . . Maintenanceman Leader Mechanical

Rebecca J. Papike . . . . . Clerk-Typist

Jeffrey W. Fleischer . . . . . Student Trainee

Temporary Personnel

Cecil R. Palmer . . . . . Maintenanceman

Henry C. Wetmore . . . . . Maintenanceman

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

I. GENERAL

A. Weather Conditions.

The year began with almost no snow. By the end of February, a total of less than two feet had fallen since the beginning of winter. Snow accumulation in the snowpack in the surrounding mountains was only 60% of normal, about 60 inches, on March 1. Temperatures were quite normal, nevertheless, with several subzero lows recorded in January and February.

March began with a storm that left us with twice the snow we had three days earlier. By the end of the month 50 inches had fallen. April and May added another 35 inches. When it was all over, the snowpack ended up 15% above normal. Another good water year was inevitable.

Spring came about 10 days later than usual. Freezing temperatures occurred almost every night until May 16. Pair counts on May 14 revealed several trumpeter swans loafing adjacent to their nests on still frozen Upper and Lower Red Rock Lakes.

Precipitation was frequent during the summer and, except for our familiar summer snowstorm, it came as rain. Total precipitation for the year was 25.65 inches, well above the average of 19.55.

Snowfalls recorded at refuge headquarters during November and December amounted to 50 inches. Even more snow fell in the surrounding mountains and the water content of the snowpack for 1971 is now only 12% below the expected season's total accumulation.

B. Habitat Conditions.

1. Water. Runoff from the above normal snowpack and summer rains contributed to ample water flows through the summer. Peak flow over the Lower Red Rock Lake structure was about 14 inches above summer levels, 8 inches below the high runoff year of 1969, but comparable to 1968.

   Total stream flow measured at 27 different sources was 108,454 acre feet, of which 32,044 acre feet were diverted over refuge grasslands. In 1969, the estimated flow was

160,963 acre feet; 38,063 acre feet were diverted.

The most notable differences in stream flows occurred in the two largest water sources, Red Rock and O'dell Creeks, which supply over 60% of refuge water. Red Rock Creek was down by 39% and O'dell Creek by 46% from 1969.

Lone Willow and Hackett Creeks flowed through the summer of 1969 but were dry by July 10 of this year, which is really more normal for these two.

Actually, 1969 was a much higher than normal water year. Comparisons with 1968 show that Red Rock Creek flows were 22% higher in 1970 and O'dell Creek flows were 36% higher, and Lone Willow and Hackett Creeks were dry by July 18 in 1968.

2. Food and Cover. Grasslands experienced one of the best growing seasons in years as June rains fell at a rate of over 100% of normal. Wildlife cover was excellent and forage for big game and livestock was more than enough.

Nitrogen enriching legumes (Lupinus spp., Trifolium spp.) responded to the heavy rains with copious growths. Smooth brome (Bromus inermus) stood 3 feet in places. Extensive and frequent stands of Great Basin wild-rye (Elymus cinereus) reflect not only the favorable growing conditions but also the reduced grazing pressure on refuge pastures. Newly established bunchgrass seedlings scattered throughout extensive sagebrush stands also attest to improving range conditions.

Marsh emmergents dominated by beaked sedge (Carex rostrata) produced their characteristically luxuriant stands. Cattail (Typha latifolia) stands, marked in 1966 and visited this summer, showed no appreciable changes.

Aquatic vegetation surveys conducted on three fixed-level ponds with relatively stable water flows showed no outstanding disparities from previous years. The aquatic survey on Upper Red Rock Lake showed some striking differences from earlier surveys, however.

The results of three surveys on Upper Red Rock Lake show that muskgrass (Chara vulgaris) has increased from 24% of the total mililiters sampled in 1966, to 33.2% in 1968,

to 58.9% in 1970. Richardson's pondweed (Potamogeton richardsonii) has shown a decrease during this same period from 43.1% of the total milliliters sampled to 36.2% to 13.2%. Both the 1968 and 1970 surveys show 50% less sago pondweed (Potamogeton pectinatus) than was sampled in 1966. Waterweed (Elodea canadensis) also has shown decreases at a steady and marked rate - from 12% in 1966 to 0.1% in 1970.

Reasons for these changes are not outwardly apparent at this time. But variances inherent in the sampling method and changes in personnel conducting the surveys should not be discounted.

WEATHER - 1970

Month	Snowfall	1970 Precipitation	Normal Precipitation	Maximum Temp.	Minimum Temp.
January	10.0	0.98	1.97	39	-34
February	2.5	0.19	1.29	57	- 9
March	50.0	3.80	1.50	43	-26
April	25.0	1.71	1.40	56	- 8
May	10.0	1.11	2.55	72	12
June	4.0	5.58	2.67	83	29
July		1.84	1.18	81	32
August		1.54	1.32	84	34
September		3.25	1.50	73	14
October	9.0	0.86	1.31	71	1
November	18.0	1.59	1.22	48	- 7
December	35.0	3.20	1.64	36	-25
TOTAL	163.5	25.65	19.55	84	-34

II. WILDLIFE

A. Migratory Birds.

Trumpeter Swans.

Population. The trumpeter swan population, made up of nesting pairs and their young and molting nonbreeders, peaked in July at 250 birds. Summer populations were somewhat higher in the past but with improved habitat on Lima Reservoir, 15 miles west of the refuge, nonbreeders are using this area more.

Swan use-days were 57,630 for the year - down by 32% from 1969. The most noteworthy decrease in use was during the period January-April which was 53% below the same period in 1969. Lower use during the winter reflects the marked divergence this year from the customary swan feeding program (see winter feeding). Lower use for the summer and fall periods reflect the increased use of Lima Reservoir by nonbreeding swans. We don't feel these differences indicate any real changes in total numbers within the tri-state swan population.

Production. Pair counts, made on May 14, disclosed 57 trumpeter swan pairs on the refuge and along Red Rock River between Lower Red Rock Lake and Lima Reservoir. Only two swans were observed on nests. The rest were standing on the ice that covered most of the marsh and lakes at this time.

A total of 39 nests were found on the refuge this year as compared to 47 in 1969 and 60 in 1968. Eleven nests were found off the refuge; 14 were found in 1969. Elk and Conklin Lakes each had a nest again. The other nests were found along Red Rock River below the refuge. Nests on the refuge were found on the following units:

Unit	Nests	Unit	Nests
Lower Lake	7 (8)*	Swan Lake	9 (8)
Rivermarsh	16 (16)	Ponds	4 (7)
Upper Lake	3 (8)		

* Number of nests in 1969.

Two pairs were noted on Upper Red Rock Lake on territories but not on nests. A search of the immediate area also failed to reveal any muskrat houses. Apparently muskrat houses

provide the only suitable nesting sites in the marsh and beaked sedge, a course rank emmergent, which dominates the marsh's vegetation is poorly suited for nest construction by the swans in the absence of a suitable base.

A pair of swans successfully nesting on the south end of Widgeon Pond for the last two years, finding habitat unsuitable this year, didn't nest.

The majority of the nests checked this year (72%) were composed of beaked sedge and all were built on muskrat houses. Mean water depth surrounding the nests was 1.3 feet. Twenty-one nests (81%) were located within 25 feet of open water with the other five ranging from 50 to 450 feet away. The base of the nests averaged 7.6 feet in diameter; the mound averaged 4.4 feet. Mean height above water was 1.1 feet. All nests showed little deviation from the above means.

Twenty-six nests were followed to determine hatching success. The first check, made on June 18 and 19, disclosed a total of 112 eggs for an average of 4.3 eggs per nest; similar to the average of 4.5 in 1969 but below the 5.1 mean found by Banko.

Hatching success was 58.9% - much better than last year's 49.5%. So even though nest attempts were higher in 1969 (47 as opposed to 39) the projected hatch for 1970 of 97 was only three less than for 1969.

Of the eggs that didn't hatch, 23 showed no trace of development and 14 contained embryos of from two to four weeks old. Three nest attempts by new pairs were abandoned. These birds will probably try again next year within the same territories, perhaps with better success.

The peak of the hatch was around the first of July which is later by almost two weeks than the usual peak hatching date of June 20. One exceptionally late nest came off on July 16. Of course, development of cygnets to flight stage, which may take 120 days, from these late nests come dangerously close to the final freeze in the fall which has been as early as mid-October, in some years.

One positive value of a late hatch, however, is that there is less chance that newly hatched cygnets will be caught in extended rain storms accompanied by freezing temperatures,

which we always seem to get in mid or late June. In 1969, we estimated that 90% of the cygnets died during the first two weeks after the hatch because of a late June storm.

So even though we started out with 8 less nest attempts this year than last, total production to flight stage (50) was estimated to be 400% above 1969. Quite obviously then, total swan production, for the year, within certain limits, is more dependent on hatching success and cygnet survival than on the size of the nesting population.

Transfers. Three nonbreeding swans from Upper Red Rock Lake were transferred to the southwestern Sandhills Region of Nebraska to replace three birds that were lost from last year's transfer.

One nonbreeder was transferred to the Charles M. Russell Game Range to replace a swan from last year's transfer that died.

Ten cygnets were transferred to Hennepin County Park Reserve District in southern Minnesota to supplement earlier refuge swan transfers to this area. A pair from an earlier transfer nested in 1969 and hatched one cygnet. These were the first nesting trumpeter swans recorded in Minnesota since the 1880's. The same pair nested successfully again this year and hatched five cygnets. They were able to raise one cygnet to flight stage, another first since the 1880's.

In keeping with new policy, all recipients picked up the swans at refuge headquarters. The three Nebraska birds were each administered 250 mg. of Tetramycin. Each of the ten cygnets were administered one capsule of Terramycin upon capture and one tablespoon of granular Oreomycin per day for two weeks.

Last year, six of 17 swans transferred by air express died within a short time after their arrival. This year, none of the birds were lost.

Winter Feeding. The basic swan feeding program followed since the establishment of the refuge has been to feed either wheat of barley immediately after the final freeze - usually in mid- November. Last winter (1969-70), we deviated markedly from this program.

Feeding was delayed as long as possible. We thought the

swans would leave the valley if supplemental feed was held back and move to the open water in the Island Park area (20 miles east of the refuge), Yellowstone Park, and the Madison River where natural food abounds. The swans refused to leave, however, and we began feeding on March 16.

From our observations during this period we've concluded that:

> There appears to be a basic refuge wintering swan population that can be correlated with the valley nesting population and its young of the year. These birds show a strong instinct to winter in the valley even if it means starving to death.
>
> As suspected by previous workers, nonbreeders winter off the refuge, part of the time, in the Island Park area and parts of Wyoming and Montana adjacent to the refuge. Although these birds make use of the supplemental feed put out on the refuge, they don't depend on it for survival.
>
> On the other hand, swans that nest in the valley and their young of the year depend heavily on supplemental winter feed. The increase in nesting swans in the Centennial Valley from 15 pairs in 1936 to 75 pairs in 1968 is probably due, in great part, to supplemental feeding. One of the primary limiting factors in pre-refuge days was probably lack of valley wintering areas with available feed.
>
> Because of their strong inclination to remain in the valley, it doesn't seem likely that harassment of the swans in the fall will drive them to other areas. Experience this year suggests that when pushed the swans will merely move onto the inaccessible expanses of Upper Red Rock Lake and the Rivermarsh.

Recommendations for future feeding programs are:

1. Delay supplemental feeding until most of the natural vegetation found in the open areas of MacDonald and Culver Ponds is used or becomes unavailable for a long period because of cold temperatures.

2. Lower MacDonald and Culver Ponds prior to freeze-up to expose more of the available vegetation.

3. Do not view initial swan mortalities as disastrous to the population.

4. Control lynx and bobcats at the feeding sites only when they prove so efficient in catching swans that they constitute a real and serious threat to the population of wintering swans.

Feeding began this winter (1970-71) on December 18 after several days of -20° F. temperatures froze most of the open areas on the ponds making the remaining aquatic vegetation unavailable to the birds. In most years, depending on the weather, feeding can probably be delayed until sometime in January.

Because we started feeding later this year, our wintering duck population, numbering 460, is lower than in past years. Former wintering populations ranged between 1,500 and 2,500 birds. And, though we couldn't get the swans to leave, it seems we've managed to get rid of a good share of the freeloading ducks.

Behavior. Shambow Pond is about 6 acres and produces lush growths of sago and slender pondweed, water buttercup and milfoil. It could probably support a pair of nesting swans. Now it serves as a display pond.

Two swans from the molting nonbreeding flock on Upper Red Rock lake were captured in July and released on Shambow Pond. They replaced two wing-clipped swans that died over the winter. The birds, both males, showed noteworthy individualistic behavior.

Whereas one of the swans was inordinately secretive spending most of its time well back in the emmergent vegetation, the other was most often seen feeding or resting on the edge of the pond. It showed little concern for traffic on the county road.

Two weeks later, two more swans were released on the pond (male and female, taken together from the nonbreeding flock on Upper Red Rock Lake and probably a pair). This pair immediately appropriated the confines of the pond as its inviolate domain. The take over of these two swans was so complete that, after their introduction, no other swans were seen again on the pond.

Within two weeks, one of the original swans was found dead. The second original swan was recaptured and released on Upper Red Rock Lake where it died the following day. Both swans were emaciated.

Apparently the territorialism of the pair was so strong that they wouldn't even tolerate the other two birds feeding on the pond. And even after they completed their molt, they remained on the pond well into fall. Neither activity on the county road nor curious visitors and photographers could startle the birds into flight.

These observations point out: 1) The marked differences in behavior among individual birds, 2) The strong territorialism shown by pairs, which often doesn't manifest itself in close confinement under artificial conditions, and explains the large areas needed to support few nesting pairs, 3) Swans can become conditioned to regular human activity and will accept man as part of their enviornment if not molested.

Behavior of this pair suggests that we can capture a molting pair in July and release them on Shambow Pond for display without wing-clipping them. Holding wing-clipped swans on the display pond through the winter poses several problems: 1) The birds have to be fed weekly, 2) They are likely to die during the winter, 3) Predator control is often necessary to prevent lynx and bobcats from killing the swans. However, lynx and bobcat are valid and valuable members of the wildlife community and shouldn't be controled if alternatives exist.

Whistling Swans

On March 23, 300 whistling swans were observed on the refuge marking their spring migration through the area. Most years they don't stop here in the spring even though a good number move through on their way north.

The first fall migrants, numbering 30, came to the refuge on the morning of October 12. They came in high at about 10,000 feet from the west. As they came over Lower Red Rock Lake, they set their wings and without hesitating dropped onto the Rivermarsh.

Throughout the following week in flocks of around 30, the swans came to the refuge in the early morning hours building up to 1,500 before the freeze on October 25. No doubt they would have remained longer if the weather hadn't turned cold. And fall use-days would have been much higher than 17,500 - 33% below the same period in 1969.

On November 20, a flock of 35 were observed flying over the refuge but not able to find open water kept on to the southwest toward Idaho.

Although whistling swans don't usually remain in the valley during the summer, we found five molting on Lima Reservoir in July. These birds were positively identified by their voice but there were other apparent differences from trumpeter swans that are worthy of remark.

1. Whistling swans were noticeably smaller (we've also found that when both are found together they can be easily separated from the air according to their comparative sizes).

2. Whistling swans were more active when approached in the airboat; more inclined to dive but not as deep as trumpeters nor for as long.

3. Whistling swans that still showed grey neck feathers (young birds) showed no yellow in the feet and legs. Trumpeters of this age class have a great amount of yellow.

4. Young whistling swans showed a faint yellow on the lores; young trumpeters show no yellow at all.

5. The yellow on the lores of the older whistling swans was distinctly bright and directly in front of the eye. Trumpeters show this coloring sometime, but when it is present it is much fainter (slightly greenish) and farther down the bill.

Geese

Use-days for the year were 61,306 - 12% above last year, 30% above 1968 - showing an upward trend in recent years after a steady decline from the highs of the early '60s. All periods

showed increases over respective periods in 1969. About 250 juveniles used Upper Red Rock Lake this summer; about 3,000 used Lima Reservoir.

Fifteen pairs were counted on May 14 on the refuge and 14 pairs were counted along Red Rock River below the refuge.

Two nests were subsequently found along Pintail Ditch. One was built on an island about 3 feet in circumference. Three goslings hatched successfully from this nest. The other nest was built on high ground in a wet area. It was abandoned in June.

A brood of six, a few days old, was observed on May 27. Three broods came off on the lower end of Lower Red Rock Lake. Estimated production for the year was 40. Goose nesting is probably severely limited on the refuge on account of interspecific strife with swans.

Ducks

Duck use-days for the year were 3,447,742 as compared to 4,742,395 for 1969 - down 27% and down by 61% from 1968. Improved habitat on the upper end of Lima Reservoir is, no doubt, responsible for this marked decrease.

The management of the reservoir has been changed and water levels now remain about 20 feet higher throughout the summer. This has created an area of several hundred acres which produces lush stands of pondweeds, waterweed, and milfoil. Not only is this ideal habitat drawing off fall migrants that would normally come to the refuge, it is also attracting large numbers of molting ducks.

Aerial counts during September showed 28,000 ducks on the refuge on September 2 and 25,000 on September 23, while counts on Lima Reservoir showed 31,500 ducks on the 2nd and 83,000 on the 27th. If we assume that the birds found on Lima Reservoir would have used the refuge if the habitat hadn't improved on the reservoir, our peak would have been 105,000 (instead of 30,250) - only 7% below 1967 which was one of the highest peaks in recent years.

Use-days were down by about 150,000 (46%) from the previous year for the January-April period as a result of the altered

winter feeding program. And for the same reason, use-days will probably remain low for this same period in 1971.

Duck production was the best in years. An estimated 11,600 ducks were produced, 135% above last year's production, almost equal to the 11,800 produced in the banner year of 1966. More breeders, better habitat, better weather, and better hatching success all contributed to the increased production.

The most common nesters in order of number of young produced were lesser scaup, mallards, ruddy ducks, redhead, canvasbacks, ring-necked ducks, widgeon, and pintails. Lesser scaup, mallards, and ruddy ducks made up nearly half of the ducks produced.

Canvasback production was up 675% from last year; redhead production was up 57%. Only blue-winged teal, down 40%, showed a decrease.

Nesting, normally late at this high altitude, was two weeks behind schedule because of the late spring. The first nest, a pintail's, was found May 15. Most birds were on nests in June, coming off in July. Newly hatched broods were common in August. A young ruddy duck, checked in a hunter's bag on October 10, had not yet reached flight stage.

Coots

The coot breeding population was 55% below last year's. Production at 3,978 was also down, but only by 28%, attesting to the better nesting conditions this year.

Use-days were 2,022,650, higher than 1969 by 7% because of a stronger fall migration.

White Pelicans

Pelicans were first seen on May 21. In numbers of up to 450, they found the shallow waters of Widgeon Pond an excellent fisheries and remained there through June. Complaints from disconsolate anglers bear witness to their efficiency

as fishermen.

The birds didn't stay all summer as they have in past years; they were gone by the end of July.

Greater Sandhill Cranes

Since 1961, crane populations have been estimated by conducting a ground count in late July or early August. The observer counted all cranes seen or heard for 15 minutes at each of 10 stations. All cranes observed while travelling between stations were also recorded. All data gathered on this count was doubled to obtain an estimate of the total refuge crane population.

In 1968, an aerial census was initiated to replace the ground count. But to compare the ground count with the newly established aerial count and to correlate past data, we also conducted the ground count in 1968 and 1969.

The aerial count follows 1/3 mile transects over all probable crane habitat with two observers recording all cranes seen. This gives excellent coverage of the refuge and a highly reliable count. However, we found that the 1968 and 1969 ground counts averaged 15% higher than the aerial counts. This generally agrees with Drewin and his work with sandhill cranes at Grays Lake Refuge where he found ground counts average around 20% higher than aerial counts.

In re-evaluating the ground count in light of these findings, we have concluded that a much higher proportion of the actual crane population was being counted than previously thought. The original estimate that 50% of the population was being counted should have been higher, we believe. Therefore, assuming: 1) a ground count coverage of 85%, 2) aerial counts average 15% lower than ground counts; we have assigned a visibility factor to the aerial census of 1.43 which assumes that 70% of the population is observable from the air.

For example, the aerial count for 1970 is 164; estimated population is 164 x 1.43 or 235. Based on previous assumptions, it would have been 386.

Here, then, are population estimates of the refuge crane population since 1961, corrected according to the above assumptions. Original estimates were 70% higher.

GREATER SANDHILL CRANE POPULATIONS FOR RED ROCK LAKES REFUGE, 1961 - 1970.

Year	Adult	Young	Total
1961	125	6	131
1962	109	2	111
1963	91	5	96
1964	164	7	171
1965	135	5	140
1966	148	8	156
1967	114	9	123
1968	119	16	135
1969	166	13	179
1970	225	10	235
Average	139.6	8.1	147.7

Production on the refuge has always seemed too low for the number of adults present and apparent number of nesting pairs. Age ratios derived from the ground counts varied from .01 to .14 (immatures per adult). Actual chicks observed have never been more than 14 in a single year. This year, after several days of searching for young cranes, no more than seven were found (age ratio - .04).

Three crane nests were found and followed through to hatching. Two came off before June 15 and one before June 20. These nests came off about 10 days later than past hatching data indicate would be normal. No crane chicks were ever observed from these nest attempts but we believe at least one of the pairs raised a chick. The other two pairs may have lost their chicks not long after they hatched.

On July 28, a crane chick, half grown, was found swimming in Upper Red Rock Lake. It was about 100 feet off the north shore and doing rather well.

Thirteen crane chicks were captured on the refuge and in the Centennial Valley and individually marked with colored 3" x 3" and 1½" x 3" nylon tags attached to the upper part of the leg. The following observations have been made of banded refuge and valley cranes:

On September 28, two banded cranes were observed in a large flock of over 800 on a staging area near Driggs, Idaho along the Teton River.

On October 26, a marked chick was observed on the Monte Vista Refuge in southern Colorado.

On October 31, a pair of banded chicks from the same brood was observed in the San Luis Valley of southern Colorado.

On November 5, the chick observed on the Monte Vista Refuge on October 26 was seen again on the same refuge.

During the first week of December, five of the banded chicks arrived at the Bosque del Apache Refuge in New Mexico.

One of two banded chicks from the same brood was either separated from its brood mate or lost sometime during the fall migration.

Shorebirds, Gulls, and Terns

Snowy egrets, rare visitors, were observed on Lima Reservoir on August 18 (12), and on Culver Pond on September 1 (1).

Great blue herons, one of the earlier arrivals, were first observed April 7. At their heronry on the north shore of Upper Red Rock Lake, 11 nests were counted. Production was 28. They were accompanied on the edges of the heronry by five pairs of black-crowned night herons which produced about 10 young.

Franklin's gulls, numbering 500, were unusually common this summer flying about the north shore of Upper Red Rock Lake.

Snipe were more noticeable during their display flights in the spring but more common in the fall as they moved through in numbers of about 1,000. They left en masse with freezing temperatures in mid-October.

B. Upland Game Birds

Blue and Ruffed Grouse

Blue grouse are now rather rare on the refuge. Several days along the timbered slopes of the Centennials revealed only four and these were all above the refuge boundary at about 9,500 feet.

Ruffed grouse are more common than blue grouse and have been sighted more often this year than last. The most seen was a covey of nine behind refuge headquarters on the edge of an aspen stand. But, apparently too many of the aspen stands have gone to homogeneous age classes, unsuitable for large grouse populations. This year's estimate of 75 is higher than for most recent years.

Sage Grouse

Sage grouse (35) were not often seen on the refuge or throughout the valley. The most seen were 15 on the Monida Hill in November.

Flocks in the early '50s adjacent to the refuge have been reported to number as high as 1,500.

Gray Partridge

None were seen nor were reported in the upper Centennial Valley this year.

C. Big Game

Elk

Elk moved back to the south side of the valley and onto the refuge in May as snows receded with warming temperatures. The most seen on the refuge this summer were seven, four cows and three calves. About 15 head used the refuge during the summer, about 85 during the fall.

The most seen moving through in the fall were 11 on November 4. A refuge neighbor reports seeing two herds, this fall, of about 30 each above the south refuge boundary.

Mule Deer

Mule deer were not as often seen as last year. The fall population was about 100. About 30 are wintering on the wind-blown slopes north of Culver Pond.

Moose

The annual aerial census conducted August 13 tallied 31 moose, 10 bulls, 15 cows, and six calves. Last year, 26 moose were counted.

The highest period of use was in the fall when snows drove additional moose onto the refuge from the surrounding mountains - 50 were estimated for this period.

For the last several years, a cow with twin calves has been observed along Tom Creek on the east end of the refuge. This year, another cow with twins was sighted on the west end of the refuge. And, although twin moose calves aren't rare, they are more common in a healthy population serving as an indicator of condition of the animals and their habitat.

Observations indicate most moose calves are born during the first 10 days of June.

A large bull wearing a red collar (Idaho Fish and Game Department marker) was discovered in unit G-1 in October behaving

rather oddly. It moved in a straight line for only a short distance before turning in ever tightening clockwise circles until it finally stumbled and fell. Judicious approach and observation revealed that the animal was blind. It was collected and closer examination disclosed that both eyes were completely clouded over. We haven't received a report, to date, on cause of blindness.

Pronghorn Antelope

Most antelope left the upper valley in November and moved back in May. One stayed through the winter and because of the mild winter probably made it to spring. Normally it wouldn't have.

The antelope count August 13 was 161, 25 bucks, 74 does, and 62 kids - slightly higher than last year's count of 139 which was a low for the last several years.

Black Bear

The number of black bears using the refuge as evidenced by sign and conversation with ranchers and sheepherders was about four. Black bears will probably never increase in this area because of the herders penchant for shooting them. A sheepherder on the Divide, south of the refuge, told us he shot two bears last year but, this year, was unable to kill one that already had taken three sheep. The night we camped next to his herd he lost two lambs to, what he thought were, coyotes.

A local rancher reported finding bear tracks by a gate to his refuge grazing unit next to Shambow Pond. He identified them as grizzly bear tracks because of the quite evident claws associated with the tracks. Although it is possible a grizzly bear could stray to the refuge from Yellowstone Park, none others have been reported in the valley for many years.

D. Fur Animals, Predators, and Rodents

Muskrats

Muskrat houses were noticeably fewer on the refuge this summer. Lack of houses on Upper Red Rock Lake probably contributed to fewer swan nests on this unit than in past years (three as opposed to eight last year). On the other hand, a new house on newly created Sparrow Pond attracted a pair of swans in a first nest attempt.

Beaver

Approximately 30 beavers were active on Red Rock, East Shambow, Tom, Matsingale, Odell, and Elk Creeks. Old beaver activities were noted on Humphrey, Collins, Duff, and Grayling Creeks but no recent sign was evident.

One troublesome individual that kept plugging the take-out to the Hayfield Diversion Irrigation System was live-trapped and released on Duff Creek on an inactive beaver pond. Apparently it was a solitary male - weight 50 lbs. - because no other beavers were trapped in this area nor was new sign found. Fresh sign downstream from the release site indicated that the beaver remained in the vicinity for about two weeks then wandered off, probably in search of habitat more to its liking.

Red Fox

Three fox dens were discovered this spring. One, on the west boundary, was found on March 23. Whenever temperatures warmed sufficiently, up to five pups were seen next to the den hole which was encrusted with snow and just big enough for the young foxes to squeeze through. The remains of two ruddy ducks and one snowshoe hare were found around the den.

Another den was found in June east of the Elk Lake road, north of Elk Creek. The remains of a yellowbelly marmot, one lesser scaup, one ruddy duck, and an unidentified shorebird were found at the den. Its proximity to the county

road provided some of the earlier visitors to the valley with their first look at a wild fox - much to their delight.

Five foxes were active around Lower Red Rock Lake at the end of the year. Sustenance at this time of the year being provided by mice, hares, and perhaps a chance muskrat.

Coyote

Coyotes were often seen on the snow at Tom Creek and around Culver Pond in the winter. Few were seen in the summer. Once common in the foothills of the Gravelly Mountains on the north side of the valley, they have been virtually eliminated from this area by trapping and poisoning.

Wolf

Local ranchers and refuge personnel tell of sighting a large black wolf along Tom Creek. Reportedly this animal has been here since 1968. And again, could be a stray from Yellowstone Park. Every so often a buffalo comes wandering through the valley, and in 1969 a wolverine, heretofore unknown in this country, was shot by a local rancher.

Ground Squirrels

It seems to be of little coincidence that the arrival of red-tailed, Swainson's, and rough-legged hawks and the appearance of badgers coincided with the emmergence of Richardson's ground squirrels on April 5. And until the ubiquitous squirrels retreated back into the ground again in August they provided a dependable supply of food for all manner of meat eaters.

E. Hawks, Eagles, and Owls

Red-tailed hawks were the earliest migrants of this group

appearing on the refuge April 2. They were followed into the valley by Swainson's hawks on April 16, and rough-legged hawks on April 17. Red-tailed and Swainson's hawks were the most common throughout the summer at about 50 and 25 each. In the fall, they were both replaced in number by rough-legged hawks which totaled about 40. Sparrow and marsh hawks were also more common in the fall at about 30 and 20 each.

Goshawks were common year-round residents along the forest edge. Cooper's and sharp-shinned hawks were only occassionally seen flying over the grasslands in the spring and summer.

Seven peregrine falcons were observed, of which at least five were probably different birds. A pair was observed flying over Culver Pond on July 15. Another pair was observed along the county road paralleling the north refuge boundary. Two were observed on August 19 hunting over Sparrow Pond. The last, a single, was observed on September 7 along the Elk Lake Road.

Many of the peregrine observations were of birds sitting on fence posts along the county road. They showed little regard for the observer if he remained in his vehicle and approached no closer than 200 yards. And if alarmed, merely flew a short way, usually to another fence post.

A falcon eyrie located along the ridge to Baldy Mountain at 9,200 feet was visited this summer on August 15. Two nests were found at the eyrie; one was old, the other was newer but didn't have the appearance of an active nest. Whitewash, quite noticeable at an active nest site, was not apparent at this eyrie or elsewhere along the cliffs.

A single prairie falcon was observed at the nest site when we first arrived but left and was not seen again during the time we remained. The only other prairie falcon observed this year was on a power pole atop the Monida Hill.

An osprey was observed at Goose Lake on the same nest that was active last year. One nestling was observed on July 10.

Eagles

Eagles, both bald and golden, were most common in the fall. The most bald eagles seen were two adults and four immatures at the Lower Lake structure on November 5. They were cleaning up crippled ducks caught in the lake as it froze. Two adult bald eagles were common residents at Culver Pond evidently feeding on ducks. No swan mortalities were noted.

A golden eagle observed on August 22 on a fence post along the Red Rock Pass road displayed odd behavior.

> We approached to within 10 feet of the bird in our pickup and stopped. At no time did it appear uneasy at our presence or attempt to leave its perch. We remained in the truck and observed the eagle for perhaps 5 minutes. Only after we got out of the truck and moved closer did it fly off. It flew well and from all appearances was in good health.

Owls

A burrowing owl, not often seen in the valley, was observed on the east end of the refuge on October 18.

F. Other Birds

A turkey vulture was seen flying over the refuge natural area in June.

Starlings are increasing in the valley and nesting as evidenced by their competition with tree swallows for nesting cavities. Flocks of up to 300 moved through in July.

Chipping sparrows, not evident in the valley, were quite common in the forested slopes of the Centennials. Other species commonly encountered in the fir forests on the south side of the refuge are pine grosbeaks, Steller's jays, solitary vireos, Clark's nutcrackers, and Townsend's solitaires.

G. Fish

Several cutthroat trout of up to 5 pounds were taken from the lower end of Red Rock Creek. A mysterious fish kill occurred on both this stream and Elk Creek in 1966. Red Rock Creek appears to have recovered somewhat from that time, but Elk Creek is still without many trout.

The fish population of Widgeon Pond was substantially diminished this spring by a voracious band of Pelicans. MacDonald Pond continued to yield nice-sized rainbow trout, but the rough fish population seems to be increasing.

H. Reptiles

Garter snakes were abundant on the Red Rock Pass Road in late August basking in the sunshine of the few remaining days of the always short summer.

I. Disease

No disease was noted this year.

III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Irrigation System

With the rejuvination of 8 miles of old irrigation ditches and the development of 2 miles of new spreader ditches all of the old irrigation systems are now in operation.

One 12" turn-out gate and twelve 12" culverts with slide gates were set in the Harlequin Irrigation System. A 12" turn-out gate was set in the Shoveler Pond overflow irrigation ditch. One 12" x 24' culvert was set across the Elk Lake road to drain irrigation waste water into an adjacent marsh.

Tom Creek Diversion take-out and measuring weir were surveyed and staked.

A total of 160 yards of riprap was put along Pintail Ditch to prevent erosion to the dike.

Water Structures

Approximately 180 yards of earth-fill were hauled and placed at the overflow of the Lower Red Rock Lake structure which was washing badly.

Log cribbing was built out to the half-round riser at the outlet of Widgeon Pond and 100 yards of rock-fill were used to reinforce the riser. We hope this will reduce vibration of the riser during periods of high water flows.

Roads

Slightly over 1 mile of road east of MacDonald Pond was surfaced with rock and gravel. It was built-up two feet with a 20 foot top to provide an all-weather road to the ponds.

Signs

All refuge boundary, directional, and informational signs were painted, repaired, or replaced.

Fences

In grazing unit G-1, 3/4 mile of new fence was built to provide a two pasture rotation grazing system. An 8' x 12' cattle guard was set in the road to allow easier access for the visiting public.

In grazing unit G-15, two new fences of 1½ and 1¼ miles each were built to provide a three pasture rotation grazing system.

Two miles of fence were rebuilt between grazing units G-15 and G-16. The rest of the fence maintenance was done by the grazing permittees with refuge provided materials.

Equipment

A surplus Thiokol Over-snow Personnel Carrier was received from Malstrom Air Force Base to supplement our fleet of snow vehicles. It has been completely reworked and proven a dependable means of transportation out of the valley.

Alpine twin track Ski-doos, purchased last year, continue to give satisfactory performance and receive exclusive use for transportation to the feeding areas and for patrol.

The wheeled vehicle fleet has been augmented by the addition of a 3/4 ton International carryall and a 1/2 ton Dodge pickup - both much needed.

Buildings

Quarters 1 received new storm windows and doors, two twindows, 6" of Zoneolite ceiling insulation, and ceiling tile in the living room.

Quarters 90 and garage received a new composition shingle roof.

The exteriors of Quarters 94 and 110 were painted. Two 5' x 6' plate glass storm windows were replaced in Quarters 94; one was replaced in Quarters 110. Both residences were rewired to meet new safety standards.

The office ceiling was insulated with 6" of Zoneolite.

The old barn at subheadquarters along with the Fitz buildings were burned.

Radio System

Portable 3 DBM aerials were installed in the Thiokol and the Ski-doos to increase the range of the portable handi-talkies.

Other

A 500 gallon underground gas storage tank was installed to replace one that leaked, and a 2,000 gallon underground gas storage tank was installed to provide additional fuel storage.

B. Plantings

1. Aquatic and Marsh Plants

None.

2. Trees and Shrubs

None.

3. Upland Herbacious Plants

None.

4. Upland Crops

None.

C. Collections

1. Seeded Propagules

None.

2. Specimens

None.

D. Control of Vegetation

None.

E. Planned Burning

None.

F. Fires

None.

IV RESOURCE MANAGEMENT

A. Grazing

The number of AUM's used by cattle this year was 11,527.62, 10% below 1969. A total of 12,765 AUM's was assigned but one of the grazing permittees was not satisfied with his allotment and chose not to use his 1,237 AUM's.

At 12,765 AUM's, the present grazing program is 20% below the stocking rate of 1965 and, we feel, finally within the carrying capacity of the refuge so that sufficient cover remains for upland nesting birds. However, because of certain questions raised by some of the grazing permittees, we will begin a nesting study in 1971 to determine the effects of grazing on upland nesters.

Revenue from the grazing program was $25,053.24.

B. Haying

Only one haying permittee remains on the refuge. He hayed 460 acres for a harvest of 287 tons. A study will be initiated in 1971 to evaluate the effects of this haying operation on upland nesting and other wildlife uses.

C. Fur Harvest

During the 1969-70 trapping season, the following were removed: 46 muskrats, 39 foxes, 19 longtail weasels, 49 mink, 187 striped skunks, and one bobcat.

The fur harvest program, beginning this year, has been discontinued. This has been done in the light of the findings of several predator-prey relationship studies, modifying refuge objectives, and shifting priorities.

D. Timber Removal

None.

V. FIELD INVESTIGATION AND APPLIED RESEARCH

A. Trumpeter Swan Neck Banding Study

In 1966, a wildlife management study was initiated by refuge personnel to determine the movements and nesting behavior of nonbreeding trumpeter swans on Red Rock Lakes Refuge.

A total of 85 swans were banded with plastic vinylite neck bands (males received solid red bands, females received solid green bands). Observations were made by refuge personnel during routine duties and scheduled censuses, and by other federal, state, and private individuals. The study was concluded August 3, 1970, with the following results.

The 2½ inch wide plastic vinylite bands used in the study caused no evident mortality or discomfort to the swans. There was no evidence of icing, even in temperatures that dipped to -40° F. Some of the bands cracked and came off, possibly because of improper forming. In other instances, some of the swans were able to easily remove the bands. There was no evidence that the bands inhibited normal behavior. In poor light and with certain swan postures, the bands were often obscured; with good light, the plastic bands could be observed up to 3/4 of a mile.

Analysis of band observations show that the nonbreeding segment of the refuge swan population remains within a 50 mile radius of the refuge. With the exception of one trumpeter swan that was recovered north of Ryegate, Montana, no banded swans were seen outside of the general limits of the tri-state (Montana, Wyoming, and Idaho) area. No band sightings were received from Yellowstone Park or the Jackson Hole, Wyoming area, suggesting that there may be at least two distinct populations in the tri-state area.

A green-neck-banded swan was reported observed at Alamo, Nevada. The species was not indicated and since Utah has been banding wintering whistling swans with similar bands there is no way of knowing if this bird was a Red Rock Lake trumpeter swan. Trumpeter swans at Kenai, Alaska have also received similar bands. Of course, these other bandings severely limited our analysis of band sightings outside the tri-state area.

If banded swans moved out of the tri-state area, they: 1) moved through uninhabited areas, 2) went unreported, 3) were reported but thought to be from other similarly banded swan populations, 4) lost their bands, 5) were not noted to be carrying bands by untrained observers.

In 1966, most of the nonbreeding swans moved off the refuge in August. Some moved back to the refuge in November, but most stayed on the upper Snake River in the Island Park area (20 miles east of the refuge). As the winter progressed, nonbreeders increased on the refuge and decreased in the Island Park area. Part of this increase was probably due to the supplemental feed put out at MacDonald and Culver Ponds. Once the nonbreeders moved from the Island Park area to the refuge, they remained in the Centennial Valley throughout the remaining months of winter and into the following summer.

Nonbreeding swans were not found on the refuge in 1967 until November, and as in the previous winter, were most abundant during March and April.

The time of movement to the refuge by nonbreeders is probably governed by the amount and availability of natural feed remaining in off-refuge wintering areas, the severity of the weather, and the magnitude of human activity.

Many of the nonbreeders on Upper Red Rock Lake were paired and some appropiated territories and attempted to nest the following year after being banded. No successful pairs in which one or both of the birds were banded were noted on the refuge.

A banded pair with four cygnets was observed off the refuge in 1968. Sightings of banded birds accompanied by cygnets indicate additional production off the refuge.

Apparently, although many nonbreeders are capable and ready to nest, very few get an opportunity to establish territories in suitable habitat on the refuge and are forced onto the limited and marginal habitat off the refuge. And, although the data do not indicate this, possibly substantial distances from it.

B. Swan Banding

Forty-seven trumpeter swans were banded on the refuge and eight were banded on Lima Reservoir. Five whistling swans found molting on Lima Reservoir were also banded.

C. Band Returns

A female trumpeter swan, banded 15 years ago as an AHY (after hatching year), was found dead on Culver Pond in February. A male, banded 15 years ago also, as an AHY was recovered on Upper Red Rock Lake in the nonbreeding flock.

A female cygnet, transferred from Red Rock Lakes to Ruby Lakes in 1949, was recovered March, 1969.

A female swan banded as an AHY, transferred to the San Diego Zoo in 1959, was over 12 years old when it died this year. A tentative diagnosis of arteriosclerosis was made.

D. Aquatic Plant Survey

Aquatic plant surveys using the Clark Webster Habitat Inventory Technique were conducted on Shambow, Widgeon and Culver Ponds, and Upper Red Rock Lake.

Shambow, Widgeon, and Culver Ponds are fixed level impoundments fed by constant, clean water sources. There weren't any marked changes in the vegetation of these three impoundments, as was to be expected. Differences between this year's surveys and earlier surveys may be due, in part, to sampling technique rather than to actual changes in the plant community. Projected tons and species composition for Culver Pond for the 1968 and 1970 surveys are more nearly comparable to each other, however, than to the 1966 survey because the 1970 survey used the same sample plots selected for the 1968 survey which were different from those used in the 1966 survey.

PROJECTED TONS OF VEGETATION PRODUCED PER ACRE IN CULVER, WIDGEON, AND SHAMBOW PONDS, AND UPPER RED ROCK LAKE.

Unit	Tons Per Acre 1966	1968	1970
Culver Pond	62.2	34.3	40.6
Widgeon Pond	31.5	*	29.1
Shambow Pond	19.2	*	14.8
Upper Red Rock Lake	7.9	7.5	12.5

* Not surveyed.

SPECIES COMPOSITION OF VEGETATION SURVEYED IN CULVER, WIDGEON, AND SHAMBOW PONDS.

Species	Percent of Total Milliliters Sampled: Culver Pond 1968	Culver Pond 1970	Widgeon Pond 1966	Widgeon Pond 1970	Shambow Pond 1966	Shambow Pond 1970
Watergrass	67.2	63.9	98.9	89.5	-	-
Muskgrass	12.5	10.7	-	0.2	17.4	1.6
Sago Pondweed	10.0	8.9	-	0.3	25.2	37.5
Milfoil	3.6	6.1	0.2	1.7	5.0	7.0
Water Buttercup	6.0	5.2	0.8	0.8	12.1	21.4
Slender Pondweed	-	4.1	-	2.4	38.2	32.4
Horned Pondweed	-	0.4	-	-	-	-
Water Starwort	-	0.4	-	-	-	-
Richardson's Pondweed	0.4	0.1	-	2.6	1.2	0.1
Threadleaf Pondweed	-	-	-	2.6	-	-
Coontail	-	-	-	0.1	-	-
Fries Pondweed	-	-	-	Tr.	-	-
Star Duckweed	-	-	0.1	-	-	-

SPECIES COMPOSITION OF VEGETATION SURVEYED IN UPPER RED ROCK LAKE.

Species	Percent of Total Milliliters Sampled 1966	1968	1970
Muskgrass	24.0	33.2	58.9
Richardson's Pondweed	43.1	36.8	13.2
Milfoil	0.7	14.5	9.7
Whitestem Pondweed	6.7	4.9	8.4
Sago Pondweed	8.7	4.7	4.3
Threadleaf Pondweed	-	-	3.0
Arrowhead	1.8	4.1	1.2
Slender Pondweed	-	-	0.7
Slender Naiad	0.4	1.0	0.3
Bladderwort	-	-	0.3
Waterweed	12.0	0.8	0.1
Water Buttercup	2.0	-	Tr.
Flatstem Pondweed	-	-	Tr.

We found that, in the 1970 survey for Upper Red Rock Lake, for the results to fall within 25% of the 95% confidence level, 150 samples were required as opposed to only 50 samples required in previous surveys for the same confidence level. We followed the original 50 sample plots selected in the 1968 survey but, in order to attain the required confidence level, we randomly selected 106 additional plots. In doing so, we increased our sampling intensity of the lake's middle which is noticeably different from its edges. We examined the desirability of stratifying the lake but found little advantage in this. Differences in the 1970 survey with earlier surveys may well reflect the increased sampling of the lake's middle.

The average depth of Upper Red Rock Lake as determined by this year's survey was 4.1. This agrees with the average depth found by Beed in his 1956 survey (3.98) and McLaury's of 1968 (3.98). The depth for both these surveys was determined by running three transects across the lake and taking the depth at 33 different stations. In contrast the average

depths as determined by the Clark Webster technique were lower in the 1966 survey (3.3 feet) and the 1968 survey (2.8 feet) - reflecting the higher number of survey samples in the shallower edges.

VI PUBLIC RELATIONS

A. Recreational Use

Refuge use continues to climb each year and this year was no exception with an increase of 92% over last year. Wildlife observation accounts for the greatest increase in use.

Activity	Visits-1969	Visits-1970
Wildlife Observation	5,581	12,680
Fishing	1,010	1,330
Hunting	355	359
Snowmobiling	150	310
Other	939	733
TOTAL	8,035	15,412

This increased use is in keeping with the general increase of all recreational use in the tri-state area. Visitors to Yellowstone Park, 50 miles east of the refuge, now exceed two million. Each year, more of these people overflow into the valley. Some come to see the swans, some to fish in the excellent streams and ponds, some just to find an uncrowded camp space away from the crush of commercialism.

B. Refuge Visitors

Date	Name	Organization	Purpose
1/6	R. E. Burns	Billings Gazette	Swan Article
4/30	Dave Cain	Weather Bureau	Instrument Check
5/12	Dave Picket	BLM	Public Access
6/1	U. I. Morey	Lecturer	Photography
6/1	W. N. Ahrens	USN (ret.)	Vacation
6/4	Harold Preston	Regional Office	Admin. Inspection
6/11	L. Madison	Madison Production	Photography
6/15	Sioux City Schools	Community School	Tour
6/24	Philip Sohladweiler	Montana F&G	Moose Browse
6/24	Guy Walker	USFS	Range Check
6/30	Ellis Klett	Regional Office	Range Check
6/30	Mitch Boken	SCS	Range Check
7/1	V. & E. Foust	Audubon Society	Inspection
7/10	Sam Short	BLM	Access
7/11	Mr. & Mrs. Zenke	Audubon Society	Birding
7/13	J. C. Antiveiler	USGS	Vacation
7/15	Russ Hoffman	BSF&W	Crane Census
7/15	Rod Drewien	Student	Crane Census
7/16	William Downs	Weather Bureau	Check Equipment
7/17	F. Morton	Tourist	Wildlife Observ.
7/27	Bill Leitch	Ecotrek	Field Trip
7/28	Ken Asay	Wyoming F&G	Vacation
7/29	Elwood Bizeau	Idaho Coop. Unit	Crane Banding
8/5	Mr. & Mrs. Blair	Washington D. C.	Visit
8/5	Mr. & Mrs. Peterson	BIA	Birding
8/13	C. Erikson	Student	Swan Research
8/17	Chuck Gibbons	BSF&W	Swan Transfer
8/19	C. J. Lankford	BSF&W	Inspection
8/20	H. Larson	BLM	Road Access
8/20	Sam Short	BLM	Road Access
8/24	J. McIlvaine	Audubon Society	Birding
9/5	H. Bolen	Professor (ret.)	Touring
9/8	Mr. & Mrs. Glans	USFS (ret.)	Visit
9/9	J. Gray	Hennepin Park, Minn.	Swan Transfer
9/9	D. Williams	" " "	" "
9/10	G. Morrison	NPS	Visit
10/5	Mr. & Mrs. Pratt	Writer	Swan Information
10/10	D. Harms	BLM	Lands Survey
10/20	Martin	BLM	Lands Inspection
10/26	Marv Plenert	BSF&W	Wilderness Study

C. Refuge Participation

February 4 - Papike attended the Beaverhead Soil and Water Conservation District Meeting.

February 4 - Stroops attended the Continental Divide Trail Proposal meeting in Idaho Falls, Idaho.

February 5 - Stroops attended the Continental Divide Trail Proposal meeting in West Yellowstone, Montana.

April 1 - Stroops attended the Work Study Program Workshop at the Montana State University.

April 30 - Papike met with State Fish and Game personnel to review hunting and fishing proposals.

May 4-7 - Papike attended Hunting and Fishing program review in Great Falls, Montana.

May 13 - Papike conducted a tour of refuge for 13 high school students from Lima.

May 29 - Papike conducted a tour of refuge for Lima grade school students.

June 10 - Stroops attended the annual Cattleman's Association meeting in Dillon.

July 28 - Papike and Fleischer conducted tours of refuge marsh for Ecotrek group and showed swan film.

September 17 - 18 - Stroops attended Systems Analysis training program in Great Falls, Montana.

September 17 - Papike and Fleischer to Ashton Forest Service District to go over proposed swan management.

September 23 - Stroops presented to the Beaverhead County treasurer's office check for share of refuge revenues.

October 1-2 - Stroops and Sullivan attended Ski-doo maintenance workshop in Idaho Falls, Idaho.

October 5 - Papike conducted a tour of refuge for Lima fifth grade class.

D. Hunting

Waterfowl

Duck hunters numbered 205, which is substantially fewer than the 270 estimated for 1969. The three hunt clubs were no longer authorized to use their facilities on the refuge (club houses and boat storage sheds) which may have disuaded some of the members from hunting on the refuge this year. In addition, improved habitat on Lima Reservoir, which intercepted many of our birds, probably also drew off some of our hunters.

The estimated waterfowl kill for the season, which only lasted three weeks because of an early freeze, was 985 - 4.8 birds per hunter.

The lower refuge waterfowl populations, this year, were evidenced, not so much by the size of the bag, but rather by the length of time required to get it - .9 hours per bird.

Over half the kill was made up of widgeon and lesser scaup. In all, 14 different species were taken. Crippling loss was about 11%.

Antelope

The antelope season opened on the same weekend as the waterfowl season - a week ahead of the general big game opener. Approximately 10 hunters used the refuge on the opener.

Estimated kill for the season was 5.

Deer and Elk

Deer and elk hunters increased from 85 in 1969 to 150 this year. But hunting success per expended effort was less with only one elk and four deer taken. Most of the deer and elk stayed high until the season was over.

Moose

Five moose permits were issued for the refuge hunting unit. All five permits were filled within two weeks of the season.

On completing his food habits and population study of refuge moose, Robert Dorn recommended that the hunting season be opened a month earlier to take advantage of the herd composition at this time which favors bulls. This year, at least, there seemed no need for an earlier season. Three of the moose taken on the refuge were bulls, as were five of the seven kills, we know of, out of 10 permits issued for the moose hunting district adjacent to the refuge.

Since 1965, five moose permits have been issued for the refuge unit; 10 permits have been issued for the unit next to the refuge. The refuge kill has been about 4.5 annually; the off-refuge kill has been about 8. But, because some moose make daily movements off the refuge, we are contributing to the off-refuge kill also. Four moose taken this year in the adjacent hunting district were animals either leaving or coming back to the refuge. So the actual kill of refuge moose, this year, was at least nine. Still, this is not excessive as summer aerial counts and other indicators show a stable or slightly increasing population. Moreover, the population is augmented by up to 25 animals which move onto the refuge in the fall from the surrounding mountains.

E. Violations

We had some difficulties with off-road traffic during the fishing season but signs and, in some cases, locks corrected the situation before it got out of hand.

No game violations were observed.

F. SAFETY

Roll bars and seat belts have now been installed on all heavy equipment.

All residences have been rewired to conform with new SAFETY standards.

Survival kits and emergency tools are provided in all over-snow vehicles.

Twenty pairs of surplus snowshoes were received and are now provided in all over-snow vehicles.

Improvements in the radio system provide longer range transmission of the smaller radio sets.

A Thiokol Over-snow Personnel Carrier has been added to the refuge fleet of snow vehicles to provide SAFE dependable transportation out of the valley.

Road improvements provide SAFER travel for refuge visitors.

SAFETY meetings were held monthly.

There have been no lost-time accidents for the last 1,481 consecutive work days.

VII OTHER ITEMS

A. Items of Interest

The population of Lakeview increased by 11% in May when refuge manager Gene Stroop's new bride came to the valley. The snowstorms of May must have been quite a shock to Janna, a native of Florida. Janna had been living in Great Falls, Montana so her opinion of our weather should have been tempered somewhat.

All refuge lands south of the Red Rock Pass road have been scheduled for wilderness study. Wilderness classification of this part of the refuge, including lands to the Continental Divide, in addition to preserving its unspoiled forests, will also provide valuable protection to the watershed that sustains Red Rock Lakes' marshes.

Increased snowmobile activity in the valley has been followed by an increased demand for refuge patrol and assistance. One snowmobiler required first aid after smashing into a tree and breaking his nose. Thirteen were rescued one night in April after going through the ice. We find that most of the snowmobilers to the valley are out-of-staters, some from as far away as Pennsylvania and Virginia.

B. Acknowledgements

Gene Stroops . . . . . Editing
Ron Papike . . . . . Preparation
Becky Papike . . . . . Typing

SIGNATURE PAGE

Submitted by:

E. D. Stroops

Eugene D. Stroops
Refuge Manager

Date: February 12, 1971

Approved by:

Clayton Lankford

Date: 3/16/71

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Form N -
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF January TO April , 19 70

(1) Species	(2) Weeks of reporting period: 12/28-1/3 1	1/4-10 2	1/11-17 3	1/18-24 4	1/25-31 5	2/1-7 6	2/8-14 7	2/15-21 8	2/22-28 9	3/1-7 10
Swans:										
Whistling										
Trumpeter	150	150	135	135	165	130	100	130	165	130
Total Swans	150	150	135	135	165	130	100	130	165	130
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Total Geese	---	---	---	---	---	---	---	---	---	---
Ducks:										
Mallard	250	250	250	250	200	200	175	175	175	75
Black										
Gadwall										
Baldpate	150	150	150	150	100	100	75	75	75	50
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										
Redhead	50	50	50	50	50	50	30	30	30	20
Ring-necked	40	40	40	40	20	20	20	20	20	20
Canvasback										
Scaup										
Goldeneye	500	500	500	500	400	400	300	300	300	250
Bufflehead	50	50	50	50	25	25	20	20	20	20
Ruddy										
Other										
Total Ducks	1,040	1,040	1,040	1,040	795	795	620	620	620	435
Coot:										

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(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF January TO April, 1970

(1) Species	(2) Weeks of reporting period: 3/8-14 (11)	3/15-21 (12)	3/22-28 (13)	3/29-4/4 (14)	4/5-11 (15)	4/12-18 (16)	4/19-25 (17)	(18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling			300						2,100		
Trumpeter	172	130	160	140	178	160	150		17,360		
Geese: Total Swan	172	130	460	140	178	160	150		19,460		
Canada	1	12	100	125	350	200	350		7,966		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other Total Geese	1	12	100	125	350	200	350		7,966		
Ducks:											
Mallard	100	250	250	500	500	300	1,000		34,300		
Black											
Gadwall											
Baldpate	50	100	100	200	500	250	350		18,375		
Pintail		35	100	350	200	200	1,000		13,195		
Green-winged teal				100	100	100	300		4,200		
Blue-winged teal											
Cinnamon teal											
Shoveler											
Wood											
Redhead	20								3,010		
Ring-necked	20					75	250		4,375		
Canvasback						200	500		4,900		
Scaup											
Goldeneye	400	500	500	750	1,500	1,500	2,000		77,700		
Bufflehead	20	30	30	50	500	200	300		10,220		
Ruddy											
Other Merganser		6	6	20	20	30	500		4,074		
Total Ducks	610	921	986	1,970	3,320	2,855	6,200		174,369		
Coot:					300	800	1,500		18,200		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	19,460	460	
Geese	7,966	350	
Ducks	174,349	6,200	
Coots	18,200	1,500	

SUMMARY

Principal feeding areas Culver Springs, MacDonald Pond and Shambow Pond.

Principal nesting areas

Reported by Ronald V. Papike, Assistant Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750
Form N. -
(Rev. March 1953)

WATERFOWL

REFUGE Red Rock Lakes MONTHS OF May TO August, 1970

(1) Species	(2) Weeks of reporting period: 4/26-5/2 (1)	5/3-9 (2)	5/10-16 (3)	5/17-23 (4)	5/24-30 (5)	5/31-6/6 (6)	6/7-13 (7)	6/14-20 (8)	6/21-27 (9)	6/28-7/4 (10)
Swans:										
Whistling										
Trumpeter	150	150	150	150	150	150	150	150	200	250
Total Swans:	150	150	150	150	150	150	150	150	200	250
Geese:										
Canada	250	250	250	250	250	250	300	300	300	300
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Total Geese:	250	250	250	250	250	250	300	300	300	300
Ducks:										
Mallard	1,500	1,500	1,500	1,500	1,500	1,500	1,500	2,000	2,200	2,500
Black										
Gadwall	350	350	350	350	350	350	350	400	400	450
Baldpate	450	450	450	450	450	450	450	500	500	550
Pintail	600	350	350	350	350	350	350	400	400	450
Green-winged teal	250	250	250	250	250	250	250	250	250	300
Blue-winged teal		75	75	75	75	75	75	75	75	100
Cinnamon teal	100	250	350	350	350	350	350	350	350	400
Shoveler	75	200	250	250	250	250	250	250	250	300
Wood										
Redhead	350	500	600	600	600	600	600	600	600	1,000
Ring-necked	250	300	300	300	300	300	300	300	300	400
Canvasback	500	450	400	400	400	400	400	400	400	800
Scaup	200	500	1,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Goldeneye	1,000	500	100	100	100	100	100	100	100	100
Bufflehead	300	250	250	250	250	250	250	250	250	300
Ruddy		300	500	750	750	750	750	750	750	1,000
Other										
Total Ducks:	5,925	6,225	6,725	7,475	7,475	7,475	7,475	8,125	8,325	10,150
Coot:	2,000	2,500	3,000	3,000	3,000	3,000	3,000	3,200	3,200	4,000

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(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF May TO August, 1970

(1) Species	(2) Weeks of reporting period: 7/05-11 (11)	7/12-18 (12)	7/19-25 (13)	7/26-8/1 (14)	8/2-8 (15)	8/9-15 (16)	8/16-22 (17)	8/23-29 (18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter	250	250	250	250	250	250	250	250	25,500	25	50
Geese: **Total Swan:**	250	250	250	250	250	250	250	250	25,500	25	50
Canada	200	200	150	100	100	100	140	140	26,810	7	40
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other **Total Geese:**	200	200	150	100	100	100	140	140	26,810	7	40
Ducks:											
Mallard	3,500	3,500	3,500	3,500	3,500	3,500	2,000	1,500	291,900	62	1,815
Black											
Gadwall	800	800	800	800	800	800	500	450	66,150	10	339
Baldpate	600	1,200	1,200	1,200	1,200	1,200	10,000	20,000	289,100	22	691
Pintail	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	83,650	19	535
Green-winged teal	550	550	550	550	550	550	500	300	46,550	10	306
Blue-winged teal	175	175	175	175	175	175			12,250	3	59
Cinnamon teal	900	900	900	900	900	900	550	550	67,900	18	508
Shoveler	550	550	550	550	550	550	300	200	42,875	10	300
Wood											
Redhead	2,000	2,000	2,000	2,000	2,000	2,000	1,500	1,500	147,350	55	1,196
Ring-necked	800	1,000	1,000	1,000	1,000	1,000	500	500	68,950	28	749
Canvasback	1,000	1,500	1,500	1,500	1,500	1,500	1,000	1,000	105,350	33	1,009
Scaup	2,000	4,000	4,000	4,000	4,000	4,000	2,500	2,500	274,400	85	2,497
Goldeneye	175	175	175	175	175	175	100	100	24,850	4	65
Bufflehead	300	400	400	400	400	400	150	150	36,400	8	281
Ruddy	1,000	1,000	1,500	1,500	1,500	1,500	1,000	500	110,600	58	1,284
Other **Total Ducks:**	15,350	18,750	19,250	19,250	19,250	19,250	21,600	30,250	1,668,275	432	11,634
Coot:	5,000	5,500	7,000	7,000	7,000	7,000	12,000	15,000	667,800	223	3,978

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	25,500	250	50	Principal feeding areas Upper, Lower Lake and Rivermarsh.
Geese	26,810	300	40	
Ducks	1,668,275	30,250	11,634	Principal nesting areas Over water in carex stands adjacent
Coots	667,800	15,000	3,978	uplands close to marsh edge.

Reported by R.V. Papike, Assistant Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750
Form N. 2
(Rev. March 1953)

W A T E R F O W L

REFUGE Red Rock Lakes MONTHS OF September TO December , 1970

(1) Species	(2) Weeks of reporting period: 8/30-9/5 (1)	9/6-12 (2)	9/13-19 (3)	9/20-26 (4)	9/27-10/3 (5)	10/4-10 (6)	10/11-17 (7)	10/18-24 (8)	10/25-31 (9)	11/1-7 (10)
Swans:										
Whistling							500	1,500	500	
Trumpeter	150	150	150	200	100	100	100	150	150	100
Geese: **Total Swans:**	150	150	150	200	100	100	600	1,650	650	100
Canada	140	150	200	200	350	350	500	500	500	300
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other **Total Geese:**	140	150	200	200	350	350	500	500	500	300
Ducks:										
Mallard	1,500	1,500	1,200	1,200	600	600	600	600	500	500
Black										
Gadwall	450	450	450	400	1,600	1,600	1,600	1,600	300	
Baldpate	20,000	20,000	20,000	18,000	18,500	18,500	18,500	18,500	5,000	1,000
Pintail	1,000	1,000	1,000	1,000	500	500	500	500	250	100
Green-winged teal	300	300	300	850	400	350	350	350	350	50
Blue-winged teal										
Cinnamon teal	550	550	550	500	250	250	250	250	100	
Shoveler	200	200	200	350	200	200	200	200	100	50
Wood										
Redhead	1,500	1,500	1,500	1,000	500	500	500	500	300	100
Ring-necked	500	500	500	200	100					
Canvasback	1,000	1,000	1,000	500	200	200	200	200	100	
Scaup	2,500	2,500	2,500	1,000	600	600	600	600	200	
Goldeneye	100	100	100	200	250	250	250	250	500	500
Bufflehead	150	150	150	200	100	100	100	100	100	100
Ruddy	500	500	500	400	100	50	50	50		
Other **Total Ducks:**	30,250	30,250	29,950	25,800	23,900	23,700	23,700	23,700	7,800	2,400
Coot:	15,000	15,000	20,000	25,000	28,500	28,500	28,500	25,000	5,000	250

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Cont. [illegible]-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Red Rock Lakes MONTHS OF September TO December, 1970

(1) Species	(2) Weeks of reporting period 11/8-14: 11	11/15-21: 12	11/22-28: 13	11/29-12/5: 14	12/6-12: 15	12/13-19: 16	12/20-26: 17	12/27-: 18	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated total
Swans:											
Whistling									17,500		
Trumpeter	100	90	90	90	120	120	150		14,770		
Geese: Total Swan:	100	90	90	90	120	120	150		32,270		
Canada	250	250	50	50					26,530		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other Total Geese:	250	250	50	50					26,530		
Ducks:											
Mallard	500	500	300	300	300	300	300		79,100		
Black											
Gadwall									59,150		
Baldpate	500	500	300	300	200	200	200		1,121,400		
Pintail	100								45,150		
Green-winged teal									25,200		
Blue-winged teal											
Cinnamon teal									22,750		
Shoveler									13,300		
Wood											
Redhead	50	50	25	25	25	25	25		56,875		
Ring-necked									12,600		
Canvasback									30,800		
Scaup									77,700		
Goldeneye	500	500	500	300	300	200	200		35,000		
Bufflehead	100	50	50	50	50	25	10		11,095		
Ruddy									15,050		
Other Total Ducks:	1,750	1,600	1,175	975	875	750	735		1,605,170		
Coot:	150	50							1,336,650		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	32,270	1,650	
Geese	26,530	500	
Ducks	1,605,170	30,250	
Coots	1,336,650	28,500	

SUMMARY

Principal feeding areas Culver Pond, Widgeon Pond, MacDonald Pond, Upper Lake, Lower Lake and the River Marsh.

Principal nesting areas

Reported by Ronald V. Papike, Assistant Refuge Manager.

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Red Rock Lakes Months of January to April 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Eared Grebe	2	Ol+/25	2	Ol+/25	2	Ol+/25				50
White Pelican	20	Ol+/21	50	Ol+/30	50	Ol+/30				50
Great-Blue Heron	2	Ol+/07	25	Ol+/30	4	Ol+/21				25
Sandhill Crane	2	Ol+/10	100	Ol+/30	3	Ol+/30				125
II. Shorebirds, Gulls and Terns:										
Killdeer	1	03/31	50	Ol+/30	3	Ol+/30				50
Common Snipe	1	Ol+/10	75	Ol+/30	2	Ol+/30				75
Long-Billed Curlew	1	Ol+/20	10	Ol+/20	1	Ol+/20				10
Willet	1	Ol+/25	10	Ol+/30	1	Ol+/30				10
Avocet	3	Ol+/27	10	Ol+/30	3	Ol+/27				10
California Gull	5	Ol+/20	100	Ol+/30	100	Ol+/30				150
Franklin's Gull	4	Ol+/28	4	Ol+/28	4	Ol+/28				20

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	1	04/16	3	04/30	1	04/30				5
White-winged dove										
Bald Eagle	1	03/16	1	03/16	1	03/16				3
IV. Predaceous Birds:										
Golden eagle	2	01/15	3	04/20	1	04/27				5
Duck hawk										
Horned owl										
Magpie	8	01/02	100	04/30	10	04/30				100
Raven										
Crow	3	01/08	50	04/10	5	04/28				100
Cooper's Hawk	2	04/02	2	04/15	2	04/15				3
Red-Tailed Hawk	1	04/02	5	04/30	2	04/30				10
Swainson's Hawk	1	04/17	5	04/30	1	04/28				10
Rough-Legged Hawk	2	04/16	2	04/25	2	04/25				3
Sparrow Hawk	1	04/27	3	04/30	1	04/27				3

Reported by Ronald V. Papike, Asst. Mgr.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Red Rock Lakes Months of May to August 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Eared Grebe	6	05/15	600	08/15	End of	Period				600
Western Grebe	2	05/30	80	08/20	"	"				80
Pied-Billed Grebe	1	06/03	20	08/20	"	"				20
White Pelican	100	05/10	450	06/20	20	07/10				600
Double Crested Cormorant	2	08/10	2	08/10	End of	Period				5
Great Blue Heron	10	05/10	75	08/15	"	"	1	11	28	75
Black-Crowned Night Heron	2	05/20	35	08/15	"	"	1	5	10	35
American Bittern	1	06/10	125	08/30	"	"				125
Sandhill Crane	35	05/06	200	08/30	"	"				250
Sora Rail	8	06/18	3,500	08/15	"	"				3,500
II. Shorebirds, Gulls and Terns:										
Killdeer	6	05/05	250	08/15	End of	Period				500
Common Snipe	2	05/01	600	08/15	"	"				600
Long-Billed Curlew	2	05/10	75	08/25	"	"				75
Spotted Sandpiper	6	05/25	150	08/15	"	"				150
Willet	2	05/10	200	08/15	"	"				200
Greater Yellowlegs	1	08/05	15	08/20	"	"				100
Long-Billed Dowitcher	50	08/20	100	08/25	"	"				350
Western Sandpiper	50	07/20	400	08/30	"	"				800
Avocet	10	05/10	200	08/15	"	"				200
Wilson's Phalarope	25	05/10	2,500	08/10	"	"				2,500
California Gull	50	05/10	200	08/15	"	"				350
Franklin's Gull	10	05/20	350	08/20	"	"				500
Forester's Tern	8	05/25	150	08/20	"	"				150
Common Tern	2	05/25	150	08/20	"	"				150
Black Tern	2	06/05	500	08/20	"	"				500

(over)

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove	1	05/01	5	08/25	End of Period			
White-winged dove								
Bald Eagle	1	07/15	1	07/15	1	07/15		2
IV. Predaceous Birds:								
Golden eagle	1	06/10	2	08/10	2	08/10		5
Duck hawk	2	07/15	4	07/25	End of Period			6
Horned owl	1	05/10	10	08/10	"	"		15
Magpie	10	05/01	200	08/20	"	"		200
Raven								
Crow	6	05/20	100	08/20	"	"		150
Goshawk	1	05/07	14	08/10	"	"		6
Sharp-Shinned Hawk	1	06/10	6	08/10	"	"		10
Red-Tailed Hawk	2	05/03	20	08/30	"	"		50
Swainson's Hawk	1	05/10	8	08/05	"	"		25
Prairie Falcon	1	07/02	2	07/02	2	07/02		4
Sparrow Hawk	2	05/25	35	08/30	End of Period			100

Reported by Ronald V. Papike, Asst. Mgr.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Red Rock Lakes Months of September to December 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:			Peaked During							
Eared Grebe	Previous	Period	Last	Period	1	09/30				350
Western Grebe	"	"	"	"	2	09/10				100
Pied-Billed Grebe	"	"	"	"	1	09/30				100
Double Crested Cormorant	"	"	"	"	1	09/05				10
Great Blue Heron	"	"	"	"	2	09/20				35
Black-Crowned Night Heron	"	"	"	"	5	09/10				15
American Bittern	"	"	"	"	10	09/10				300
Sandhill Crane	"	"	"	"	3	10/06				250
Sora Rail	"	"	"	"	30	09/10				2,500
II. Shorebirds, Gulls and Terns:										
Killdeer	"	"	"	"	1	10/06				200
Common Snipe	"	"	"	"	10	10/20				1,000
Willet	"	"	"	"	2	10/25				100
Greater Yellowlegs	"	"	"	"	15	09/10				35
Long-Billed Dowitcher	"	"	"	"	50	09/10				200
Western Sandpiper	"	"	"	"	20	09/30				500
Avocet	"	"	"	"	5	09/10				75
Wilson's Phalarope	"	"	"	"	30	09/30				1,000
California Gull	"	"	"	"	2	10/12				150
Franklin's Gull	"	"	"	"	10	09/10				350
Forester's Tern	"	"	"	"	10	09/10				200
Black Tern	"	"	"	"	2	09/20				350

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	Previous	Period	30	09/05	2	11/20				60
White-winged dove										
Bald Eagle	"	"	10	12/05	End of Period					20
IV. Predaceous Birds:										
Golden eagle	"	"	8	10/20	1	12/10				25
Duck hawk	"	"	4	09/01	1	09/07				6
Horned owl	"	"	15	11/01	End of Period					15
Magpie	"	"	200	09/01	End of Period					250
Raven	4	12/10	10	12/25	End of Period					10
Crow	Previous	Period	50	10/01	1	12/25				100
Goshawk	"	"	10	10/01	End of Period					10
Red-Tailed Hawk	"	"	20	09/10	1	09/25				30
Swainson's Hawk	"	"	10	09/10	1	09/20				15
Rough-Legged Hawk	1	09/25	20	10/20	1	11/10				40
Sparrow Hawk	Previous	Period	10	09/20	1	10/10				30

Reported by Ronald V. Papike, Asst. Mgr.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge **Red Rock Lakes** For 12-month period ending August 31, 19**70**

Reported by **R.V. Papike** Title **Assistant Refuge Manager**

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage		(3) Use-days	(4) Breeding Population	(5) Production
UNIT I	Crops		Ducks	813,100	826	1,305
Impoundments	Upland		Geese	8,740	10	15
&	Marsh		Swans	28,365	6	
Creeks	Water	350	Coots	126,800	88	72
	Total	350	Total	977,005	930	1,392
UNIT II	Crops		Ducks	1,219,700	980	3,519
Upper	Upland		Geese	44,260		
Lake	Marsh	20	Swans	34,570	6	2
	Water	2,880	Coots	489,000	104	252
	Total	2,900	Total	1,787,530	1,090	3,773
UNIT III	Crops		Ducks	203,300	570	1,049
Swan	Upland		Geese	600		
Lake	Marsh	100	Swans	5,300	18	10
	Water	300	Coots	108,675	234	432
	Total	400	Total	317,875	822	1,491
UNIT IV	Crops		Ducks	406,500	1,590	4,373
Rivermarsh	Upland		Geese	526	14	20
	Marsh	6,267.5	Swans	8,000	32	23
	Water	2,000	Coots	416,500	750	2,322
	Total	8,000	Total	831,526	2,386	6,738
UNIT V	Crops		Ducks	1,382,294	376	1,388
Lower	Upland		Geese	3,500	4	5
Lake	Marsh	340	Swans	11,519	14	15
	Water	1,200	Coots	652,275	356	900
	Total	1,540	Total	2,049,588	750	2,308
UNIT VI	Crops		Ducks	40,650		
Upland	Upland	26,566	Geese	600		
	Marsh	150	Swans	886		
	Water	50	Coots	18,000		
	Total	26,766	Total	60,136		
	Crops		Ducks	4,065,544	4,342	11,634
	Upland	26,566	Geese	58,226	28	40
	Marsh	6,610	Swans	88,640	76	50
	Water	6,780	Coots	1,811,250	1,532	3,978
	Total	40,223.5	Total	6,023,660	5,978	15,702

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1750c
Form NR ;
(Sept. ,60)

WATERFOWL HUNTER KILL SURVE

Refuge Red Rock Lakes

Year 1970

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/10-16	50	209	Widgeon 63, Scaup 52, Gadwall 21, Canvasback 16, Shoveler 13, Mallard 11, Ruddy 9, Pintail 8, Goldeneye 7, Cinnamon teal 7, Canada Goose 6, Redhead2, Bufflehead 2, Green-winged teal 2.	219	25	244	150	732
10/17-23	15	55	Widgeon 25, Scaup 14, Gadwall 6, Canvasback 5, Mallard 5, Cinnamon teal 3, Canada Goose 3, Redhead 2, Pintail 2, Bufflehead 1.	66	10	76	45	228
10/24-30	2	5	Widgeon 3, Scaup 1.	4	1	5	10	25
TOTAL	67	269	Widgeon 91, Lesser Scaup 67, Canvasback 21 Mallard 16, Shoveler 13, Pintail 10, Cinnamon Teal 10, Ruddy,9, Canada Goose 9, Goldeneye 7, Redhead 4, Bufflehead 3, Green-winged teal 2, Gadwall 27.	289	35	325	205	985

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1752
Form -2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Red Rock Lakes Months of January to April, 1970

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Blue Grouse	Conifers 3,000 acres								15	
Ruffed Grouse	Aspen-fir-willow 3,000 acres								45	
Sage Grouse	Sagebrush-grass 3,000 acres								10	
Gray Partridge	Sagebrush-meadow 24,000 acres								25	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form 2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Red Rock Lakes Months of May to August, 19 70

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Blue Grouse	Conifers 3,000 acres								25	
Ruffed Grouse	Aspen-fir-willow 3,000 acres								50	
Sage Grouse	Sagebrush-grass 3,000 acres								70	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form 3-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge **Red Rock Lakes** Months of **September** to **December**, 19**70**

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Blue Grouse	**Conifers 3,000 acres**								**20**	
Ruffed Grouse	**Aspen-fir-willow 3,000 acres**								**75**	
Sage Grouse	**Sagebrush-grass 3,000 acres**								**35**	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-17
Form ...-3
(June 1945)

BIC AME

Refuge Red Rock Lakes Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
Black Bear												4	1	
Elk			1									85		
Mule Deer			4									100	15	
Moose			5									50	30	
Antelope			5									161		M-25 F-74 Y-62

Remarks:

Reported by R.V. Papike, Asst. Refuge Manager

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-17
Form ..R-4
(June 1945)

SMALL M..MALS

Refuge Red Rock Lakes Year ending April 30, 1970

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5) Total Population
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
Beaver	Willow, aspen, streams 2,400 acres	80												30
Muskrat	Marsh-water 10,000 acres	2		46				T-6712	100%					4,500
Porcupine	Upland forest 5,000 acres	71												70
Coyote	Marsh, meadow, upland 26,000 acres	3,250												8
Red Fox	Marsh, meadow, upland 26,000 acres	130		39				"	"					20
Long-Tailed Weasel	Meadow, uplands, forest 19,000 acres	127		19				"	"					150
Mink	Lakes, streams, marsh 15,000 acres	38		49				"	"					400
Badger	Meadow, uplands, forest 19,000 acres	633												30
Striped Skunk	Marsh, meadow, upland 26,000 acres	113		187				"	"					230
Bobcat	Upland forest 25,000 acres	1,666		1				"	"					15

* List removals by Predator Animal Hunter

REMARKS:

Reported by Ronald V. Papike, Asst. Mgr.

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

3-1755
Form R-5
6070

DISEASE

Refuge Red Rock Lakes Year 1970

Botulism NONE NOTED

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease NONE NOTED

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTI , RECEIPTS, AND PLANTINGS

Refuge Red Rock Lakes Year 19 70

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
						NEGATIVE REPORT							

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

INTERIOR--PORTLAND, OREGON

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Red Rock Lakes County Beaverhead State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
NONE								NONE	
								Fallow Ag. Land NONE	

No. of Permittees: Agricultural Operations NONE Haying Operations 1 Grazing Operations 18

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle	5,937	11,527.62	23,053.24	25,520
				2. Other	5	15	35	115
				1. Total Refuge Acreage Under Cultivation				
Hay - Wild	286.78	460	2,007.46	2. Acreage Cultivated as Service Operation				

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.DUP.,D.C.61-88850

3-1570
NR-8a
(4/54)

REFUGE GRAIN REPORT

Refuge Red Rock Lakes Months of January through December, 1970

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Wheat	3,500	600	4,100			700		3,400		3,400	

(8) Indicate shipping or collection points Camas National Wildlife Refuge

(9) Grain is stored at Culver and MacDonald Ponds

(10) Remarks Supplemental winter swan feed.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb.; corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 17065

3-1761
Form NR-1

TIMBER REMOVAL

Refuge Red Rock Lakes Year 1970

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
			NEGATIVE REPORT					

Total acreage cut over..... Total income.....

No. of units removed B. F..... Method of slash disposal.....
Cords.....
Ties.....
.....

Interior--Duplicating Section, Washington, D. C.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge: **Red Rock Lakes**

Proposal Number:

Reporting Year: **1970**

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NEGATIVE REPORT							

10. Summary of results (continue on reverse side, if necessary)

INTERIOR—PORTLAND, OREGON

REFUGES ARE FOR . . . RESEARCH

Thirteen greater sandhill crane chicks were individually marked with nylon tags.

The banded chicks are providing valuable data on the migration routes of this species.

A fox pup marks the west boundary of the refuge.

And on the refuge, foxes found plenty to eat.

. . . and PEOPLE

Fishermen spent 3,400 hours on the refuge.

Big game hunters spent 625.

Opportunities for wildlife photography attract both amateurs and professionals alike.

Student Trainee Jeff Fleischer finds the intricacies of a beaver live-trap frustrating to a budding biologist.

But perseverance along with a little help rewarded him with this old-timer which was moved to a location where it would be less troublesome.

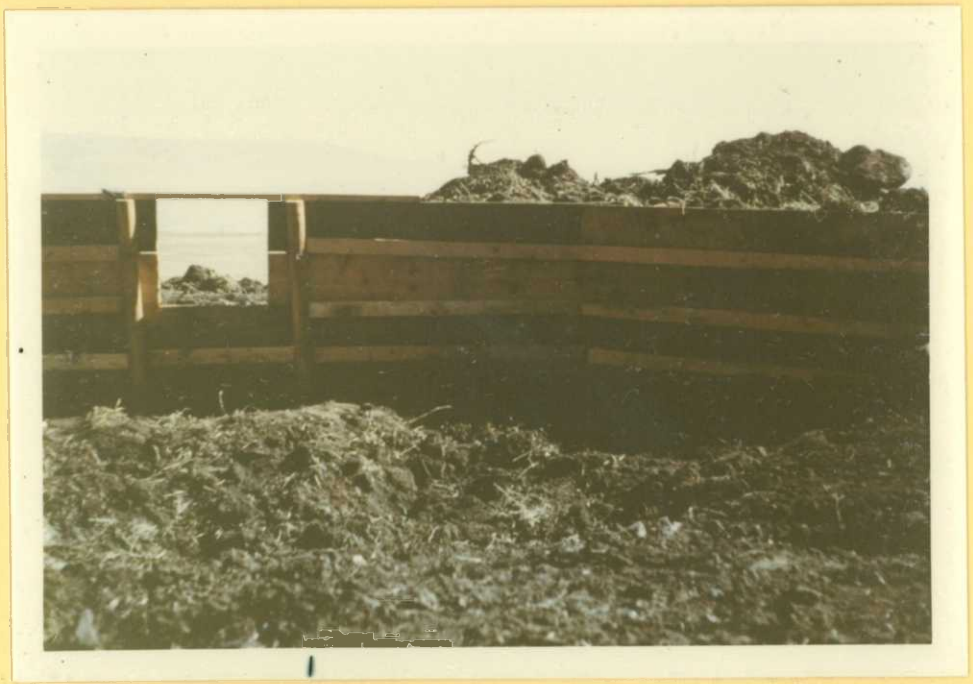
. . . but perhaps most of all REFUGES ARE FOR PRESERVING

Lands to the Continental Divide will be studied for their wilderness values.

Wilderness classification for these lands will provide watershed protection.

It will provide inviolate preservation for its unspoiled forests.

The precipitous Centennial Mountains catch winter's snows which annually replenish the refuge's marshes.



Rectangular weirs measure water flows on several of the smaller water sources.

WINTER COMES TO THE VALLEY

The road closes December 1 this year.

Only snow vehicles move now.

The accumulating snow will be measured each month until May.

This is one of two living room windows in Quarters 1 that were replaced by . . .

two 5' x 6' Twindows - an improvement most noticeable during the long bleak winters.

This surplus Thiokol Over-snow Personnel Carrier has proven a dependable means of transportation out of the valley.

Alpine twin track Ski-doos receive exclusive use for transportation to the feeding areas and for patrol.

All refuge boundary, . . .

directional, and informational signs were painted, repaired, or replaced.

Our highly expected, though not esteemed, summer snow storm.
This one, this year, brought 4" on the 30th of June.